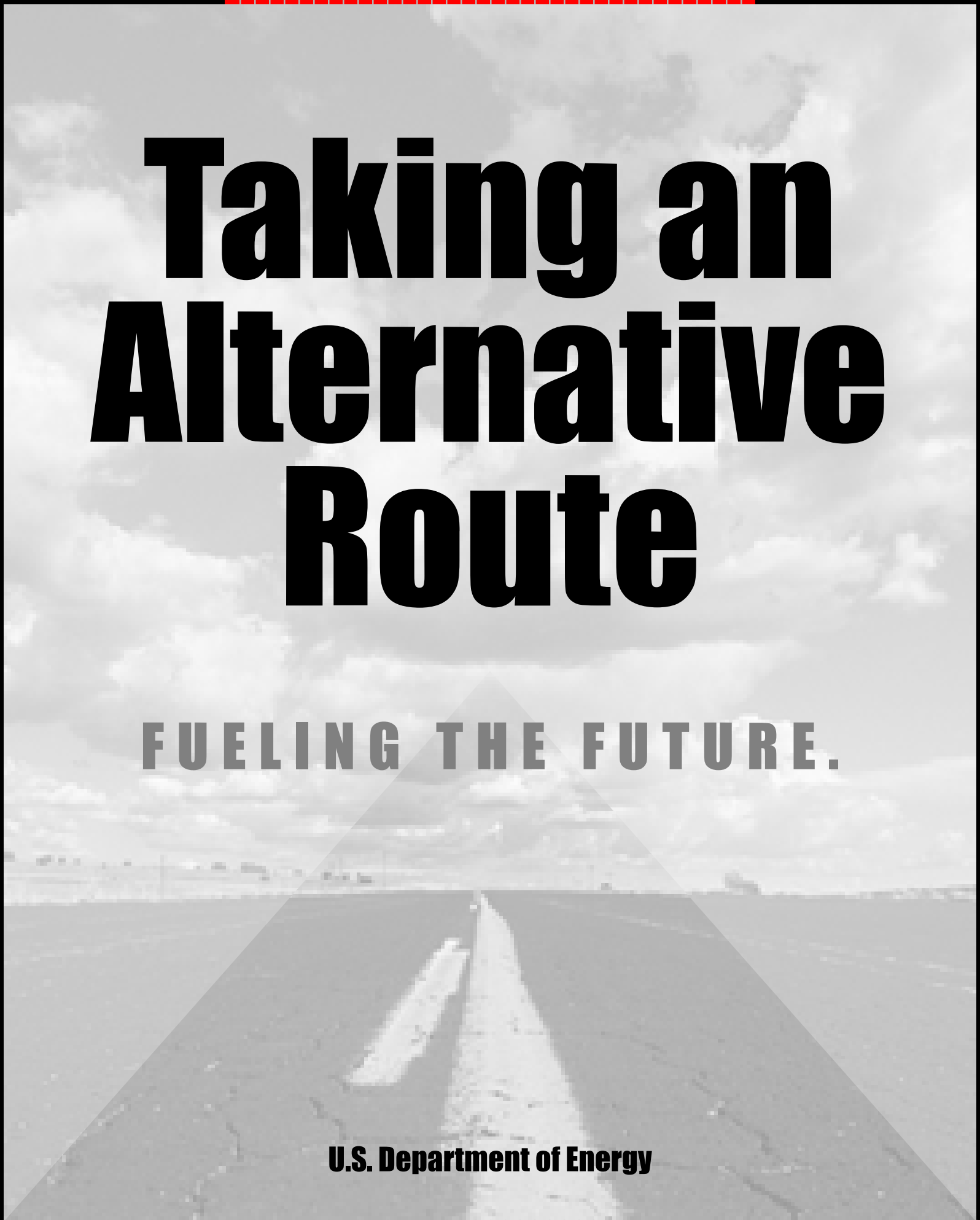


Taking an Alternative Route

FUELING THE FUTURE.

U.S. Department of Energy

GLOSSARY OF TERMS

THE TERMS ALTERNATIVE FUEL, NONPETROLEUM FUEL, DOMESTIC FUEL, AND CLEAN FUEL ARE OFTEN USED INTERCHANGEABLY, AS ARE CLEAN-FUEL VEHICLE AND ALTERNATIVE-FUEL VEHICLE. IN THIS PUBLICATION, THE USE OF SUCH TERMS IS DEFINED IN ACCORDANCE WITH THE ENERGY POLICY ACT (EPACT) OF 1992 AND THE 1990 CLEAN AIR ACT (CAA):

ALTERNATIVE FUEL – as defined by the Energy Policy Act, alternative fuels are methanol, denatured ethanol, and other alcohols; mixtures containing 85% or more by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; natural gas; liquefied petroleum gas; hydrogen; coal-derived liquid fuels; fuels (other than alcohol) derived from biological material; and electricity.

ALTERNATIVE-FUEL PROVIDER – a fuel provider (or any affiliate or business unit under its control) is an alternative-fuel provider if its principal business is producing, storing, refining, processing, transporting, distributing, importing, or selling (at wholesale or retail) any alternative fuel (other than electricity), or generating, transmitting, importing, or selling (at wholesale or retail) electricity; or if that fuel provider produces, imports, or produces and imports (in combination) an average of 50,000 barrels per day of petroleum and 30% (a substantial portion) or more of its gross annual revenues are derived from producing alternative fuels.

ALTERNATIVE-FUEL VEHICLE (AFV) – as defined by the Energy Policy Act, this is any dedicated or dual-fueled vehicle. In practice, this term also refers to bi-fuel and flexible-fuel vehicles.

CLEAN FUEL – as defined by the Clean Air Act, this is any fuel or power source that enables a vehicle to emit less pollution than would be the case with conventional gasoline or diesel fuel. Clean fuels include alternative fuels, reformulated gasoline, and clean diesel fuel.

CLEAN-FUEL VEHICLE (CFV) – as defined by the Clean Air Act, this is a vehicle in a class or category of vehicles that has been certified by the U.S. Environmental Protection Agency for any model year to meet Clean-Fuel Fleet standards.

DOMESTIC FUEL – as defined by the Energy Policy Act, Section 301, domestic fuel is derived from resources within the United States, its possessions and commonwealths, and Canada and Mexico (the two nations currently in a free trade agreement with the United States).

PETROLEUM FUEL – gasoline and diesel fuel.

OTHER TERMS THAT WILL BE HELPFUL TO KNOW AS YOU READ THIS PUBLICATION ARE DEFINED BELOW:

BI-FUEL VEHICLE – a bi-fuel vehicle has two separate fuel systems designed to run either on an alternative fuel or on gasoline or diesel, but uses only one fuel at a time. Bi-fuel vehicles are referred to as "dual-fuel" vehicles in the CAA and EPACT.

CONSOLIDATED METROPOLITAN STATISTICAL AREA (CMSA) – an urban center and surrounding areas, as currently defined by the U.S. Bureau of the Census, with a population greater than 250,000.

CONVERTED OR CONVERSION VEHICLE – a vehicle designed to operate on gasoline or diesel that has been modified or altered to run on an alternative fuel.

DEDICATED VEHICLE – a vehicle that operates solely on one fuel. Generally, dedicated vehicles have superior emissions and performance results because their design has been optimized for operation on only a single fuel.

DUAL-FUEL VEHICLE (CAA DEFINITION) – a vehicle with two separate fuel systems, designed to run either on an alternative fuel or on gasoline or diesel, but using only one fuel at a time.

DUAL-FUEL VEHICLE (EPACT DEFINITION) – a vehicle designed to operate on a combination of an alternative fuel and a conventional fuel. This includes vehicles using a mixture of gasoline or diesel and an alternative fuel (usually ethanol or methanol) in one fuel tank, commonly called flexible-fuel vehicles; and vehicles capable of operating on an alternative fuel (usually compressed natural gas or propane), a conventional fuel, or both simultaneously, using two fuel systems; these are commonly called bi-fuel vehicles.

EMISSION STANDARDS – to be categorized as low-emission, inherently low-emission, ultra-low-emission, or zero-emission, a vehicle must meet either the U.S. Environmental Protection Agency's Clean-Fuel Fleet or the California Air Resources Board's emission standards.

- Low-Emission Vehicle (LEV) – emits fewer emissions than a conventional vehicle. Fleet owners opting for early or extra purchases of clean-fuel vehicles that meet LEV standards earn credits that can be "banked" or traded against fleet vehicle purchase requirements within the CMSA, as designated by the Clean Air Act.

- Inherently Low-Emission Vehicle (ILEV) – meets ILEV exhaust emission standards and produces very few or no evaporative emissions. ILEVs will be dedicated alternative-fuel vehicles in most cases. ILEV credits can also be banked within the CMSA.

- Ultra-Low-Emission Vehicle (ULEV) – produces fewer exhaust emissions than does a LEV. ULEV credits can also be banked within the CMSA.

- Zero-Emission Vehicle (ZEV) – a vehicle that emits no exhaust emissions at vehicle tailpipe. ZEV credits can also be banked within the CMSA.

FLEXIBLE-FUEL VEHICLE (FFV) – a vehicle with a single tank, powered by any mixture of gasoline and either ethanol or methanol.

OEM – original equipment manufacturer.

Taking an Alternative Route

Concern about the environment and our country's dependence on petroleum from foreign sources has hastened the development of new domestic sources of power for vehicles and new vehicle technologies.

The United States continues to consume more than one-fourth of the world's oil production, but it produces only about one-tenth of the oil. The transportation sector currently accounts for approximately two-thirds of all U.S. petroleum use and roughly one-fourth of total U.S. energy consumption. A virtual one-to-one relationship exists between additional gasoline consumption and the nation's increased use of imported oil. Greater use of domestic energy supplies in the transportation sector could mean less dependence on foreign oil.

America spends approximately $60 billion per year to import over 50% of its oil; imports are expected to approach 60% by the end of the decade. Domestic oil production has drastically declined, taking with it over 25% of the jobs that existed in this sector in the early 1980s.

Increased use of domestically produced alternative fuels would enable us, as a nation, to be in greater control of our energy resources and fuels. There's a potential economic benefit, too. A reduction in oil imports could mean a growth in the domestic economy, with new jobs, if these alternative fuels replace imported petroleum.

On the environmental front, many Americans living in metropolitan areas face possible chronic damage to their health from long-term exposure to air pollutants. Emissions from the 190 million cars and trucks in this

country account for about half of all air pollution and more than 80% of urban air pollution. About 62 million people—almost a quarter of the U.S. population—live in areas that violate federal public health standards for clean air. One of the most obvious forms of air pollution is the smog that can hang over cities in the hot days of summer. Smog consists primarily of ozone, and cars produce a major share of the pollutants that form ozone. The good news is that new cars produce lower amounts of ozone-forming emissions than do older cars, and some alternative-fuel vehicles produce even less.

New Directions, New Choices

Only a few years ago, the idea of cars fueled with something other than gasoline sounded like a scientific "pie-in-the-sky." The possibility of vehicles using alternatives to conventional gasoline and diesel fuel seemed little more than an intriguing thought. Now, it's safe to say, we've come a long way in a short time. Thousands of vehicles powered by alternative fuels are on the nation's roads, with more joining them every day.

Americans are heading down a new road toward reducing our dependence on conventional petroleum fuels in the transportation sector. Legislation enacted in the early 1990s is speeding the use of alternatives to conventional gasoline and diesel fuels. Fleet owners need to be aware of two federal laws, the 1990 Clean Air Act (CAA) and the Energy Policy Act of 1992 (EPACT), that may require fleet operators to acquire vehicles that operate on alternatives to conventional petroleum fuels.

The CAA requires individual states to implement Clean-Fuel Fleet Programs, while the EPACT requires the U.S. Department of Energy to implement an Alternative-Fuel Fleet Program. Many state and local agencies have also implemented laws and incentives that promote the increased use of alternatives to conventional gasoline and diesel fuel.

Fleets Will Pave the Way

The U.S. Department of Energy (DOE) recognizes that the requirements put forth by the Energy Policy Act and the Clean Air Act overlap in many areas and that fleet owners may have some difficulty in interpreting the laws. As a result, DOE has prepared this brochure for fleet owners to serve as a "roadmap" through the two federal laws and to provide basic information on currently available alternative fuels.

In passing the CAA and EPACT legislation, Congress recognized fleets as being uniquely suited to introduce new fuel and vehicle technologies. Fleet vehicles typically accumulate higher annual mileage than private vehicles and are replaced sooner. By using alternative-fuel vehicles certified to meet the Clean-Fuel Fleet standards established by the U.S. Environmental Protection Agency (EPA), fleets can shorten the amount of time it takes to improve our air quality and pave the country's route to energy independence.

Your maintenance know-how and centralized facilities allow you to adapt more readily to new technologies than can private vehicle owners and mechanics. When you purchase and use alternative-fuel vehicles, you'll be increasing demand for the new technologies and fuels, as well as generating experience necessary to the technologies' success. Ultimately, this may lead to wider choices of vehicles and clean, economical fuels for your fleet.

Because both CAA and EPACT provide incentives for fleet owners—even those not covered by the laws—to buy and use vehicles powered by the new fuels, it becomes very important for you to be able to choose knowledgeably among your alternatives. As a potential buyer, you should know each fuel's advantages and disadvantages and the need that each addresses. The best choices for you will be those fuels and vehicles that balance your business objectives against emissions, fuel and vehicle availability, fueling convenience, range, vehicle capacity, operating performance, and cost, among other factors.

Why Purchase AFVs?

The primary reasons for purchasing alternative-fuel vehicles are that 1) your fleet must comply with federal, state, and local laws, and with current or future regulations; and 2) alternative-fuel vehicles may be a good fit for your business.

The accompanying flowcharts (see foldout) serve as a "roadmap" through the two federal laws, providing incentives and opportunities for you—even if you're not covered by the laws—to buy and use alternative fuels.

Complying with Regulations and Laws

The Energy Policy Act's primary purpose is to increase U.S. energy security through increased use of alternative fuels. Through the use of domestically produced alternative fuels, our nation will gain greater control of its energy resources. Beginning in 1993, EPACT established separate requirements for different types of fleets to acquire vehicles that operate on alternative fuels.

In contrast, the Clean Air Act seeks to improve our country's air quality. The CAA allows the use of any fuel, including alternative fuels, so long as the vehicles meet the EPA Tier 1 standards for engines and vehicles. For vehicles or engines to qualify for use in designated nonattainment areas, they must be certified to meet Clean-Fuel Fleet standards: LEV, ULEV, ILEV, or ZEV (see glossary at the beginning of this document).

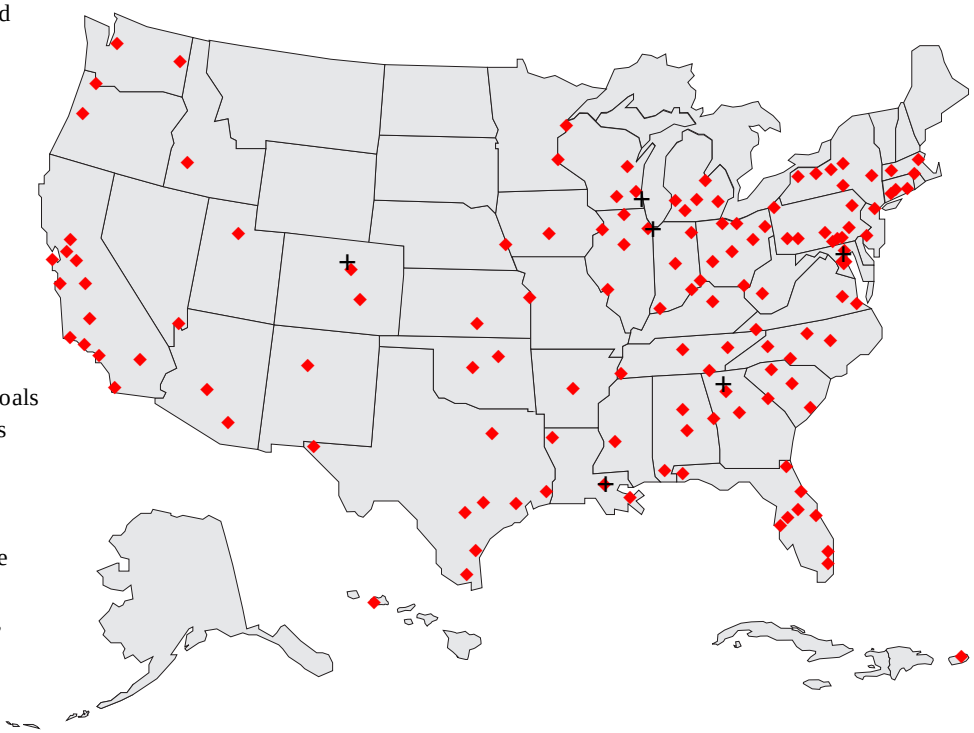
Your fleet may be covered by the EPACT, the CAA, or both. The "Regulations and Laws" section of the flowchart combines key aspects of the two laws into a sequence of questions that will help you determine if and how your fleet might be covered by one or both laws. If you find that your fleet is not covered by either law, consider purchasing alternative-fuel vehicles for other benefits you may accrue. Other state and local laws may also apply to your fleet. The U.S. Department of Energy, which tracks the most recent information on federal regulations and state and local laws, has established the National Alternative Fuels Hotline (800/423-1DOE) to disseminate that information.

What Type of Fleets Do You Operate?

The EPACT and the CAA require that certain types of fleets participate in the

Alternative-Fuel Fleet and Clean-Fuel Fleet programs, respectively. Beginning in 1993, EPACT requirements affected only federal government fleets. However, as directed by several sections of EPACT, DOE enacted regulations (10CFR 490) in 1996 that apply to state government and to fuel provider fleets. (The glossary at the beginning of this document provides the definition of alternative-fuel provider.) DOE has not enacted regulations that apply to private and municipal fleets. In the future, however, if DOE finds that goals for displacing petroleum-based fuels with alternative fuels are not being met through mandatory purchases by federal and state fleets and fuel providers, it can then require private and municipal fleets to acquire alternative-fuel vehicles. In contrast, the CAA requirements take effect in model year 1999 and apply to all fleets simultaneously.

Areas Covered by EPACT ◆ and CAA +



Both laws and accompanying regulations have in common certain exemptions for fleet vehicle categories and operating conditions. Vehicle categories not included by law or by accompanying regulations are

- Those held for lease or rental to the general public;
- Those held for sale by dealers, including those used for demonstrations;
- Those used by original equipment manufacturers for product evaluations or tests;
- Law enforcement;
- Emergency;
- Nonroad, used for farm and construction purposes;
- Industrial, commercial, marine, rail, or airport facilities; and
- Military, certified for national security.

Both laws and accompanying regulations also provide conditional exemptions. Motor vehicles that, in normal operations, are parked at personal residences at night are exempt. Furthermore, to relieve undue hardship on fleets, both laws allow excessive costs, technical feasibility, and availability of alternative fuels or alternative-fuel vehicles to be considered as reasons for exemptions.

The 1996 EPACT regulations also grant exemptions to alternative-fuel provider fleets (see glossary definition) if

- Alternative fuel is not the company's principal business;
- Sale of alternative fuels provides less than 30% of the company's gross annual revenues;
- The company does not use alternative fuels for transportation but consumes them as feedstock or transforms them into a product other than alternative fuel.

If your fleet is "centrally fueled" or "capable of being centrally fueled," it may be covered by both laws. The EPA defines these terms to mean a fleet or part of a fleet that is capable of being fueled 100% of the time at a location owned, operated, or controlled by the covered fleet operator, or at a location that is under contract with the covered fleet operator. In contrast, the EPACT definition uses 75% of the time.

Where Is Your Fleet Located?

Both laws apply to consolidated metropolitan statistical areas (CMSAs) with populations of 250,000 or more. The Clean Air Act narrows the CMSAs down to those with the most difficult ozone and carbon monoxide pollution problems. The six CMSAs currently covered by the CAA and the 129 CMSAs covered by the EPACT are listed on pages 18 to 20. Because the CMSAs often extend a substantial distance beyond a named city, we have also identified the affected counties in each CMSA in the table.

For certain CMSAs covered by both laws, EPA and DOE may include different counties in an area defined as a CMSA. The EPA includes counties in a CMSA that have been defined by the 1980 U.S. Census, while the DOE

includes counties that have been defined by the 1990 U.S. Census.

In general, if your fleet operates in any of the six CMSAs covered by the Clean Air Act, then both the CAA and EPACT apply. If your fleet operates in one of the CMSAs not covered by the Clean Air Act, then only the EPACT applies. For more information on the CAA's Clean-Fuel Fleet program, call Jim Lindner, U.S. Environmental Protection Agency (313/668-4558).

How Many Vehicles Are in Your Fleet?

The EPACT applies to fleets with a minimum size of 20 vehicles locally and 50 vehicles nationally. The CAA applies to fleets with a minimum of 10 vehicles.

What Size Are the Vehicles in Your Fleet?

In CMSAs and for fleet sizes affected only by the CAA, vehicles of less than 26,000 lb gross vehicle weight rated (GVWR) are covered. In CMSAs and for fleet sizes affected only by the EPACT, vehicles of 8,500 lb GVWR or less are covered. Finally, in CMSAs and for fleet sizes affected by both laws, vehicles of 8,500 lb GVWR or less are covered by both laws. Fleets with vehicles between 8,501 and 26,000 lb GVWR are subject only to CAA requirements, but they may be eligible for EPACT credits.

How Many Alternative-Fuel Vehicles Are You Required to Buy, and When?

The two laws cover different but sometimes overlapping types of fleets and use different schedules to require

New Fleet Vehicle Purchases Required by EPACT/CAA

TABLE 1

	CAA		EPACT			
Year	GVWR less than 8,500 lb (% of CFVs)	GVWR less than 26,000 lb (% of CFVs)	Federal[a] (% or # of AFVs)	State[b] (% of AFVs)	Alternative-Fuel Provider[b] (% of AFVs)	Municipal/ Private[c] (% of AFVs)
1993			5,000			
1994			7,500			
1995			10,000			
1996			25%			
1997			33%	10%	30%	
1998			50%	15%	50%	
1999	30%	50%	75%	25%	70%	
2000	50%	50%	75%	50%	90%	
2001	70%	50%	75%	75%	90%	
2002	70%	50%	75%	75%	90%	20%
2003	70%	50%	75%	75%	90%	40%
2004	70%	50%	75%	75%	90%	60%
2005	70%	50%	75%	75%	90%	70%
2006	70%	50%	75%	75%	90%	70%

[a] Fiscal year for federal fleet acquisition requirements; model year for all others.
[b] As required by 10CFR Part 490.
[c] May be required by regulations if DOE finds these acquisitions are necessary.

purchasing of alternative-fuel vehicles. Table 1 describes the covered fleets and schedules unique to each law. If you are covered by both EPACT and CAA, you will be required to conform to both laws. If you are covered, the percentages in both laws apply only to the new vehicles you purchase during that year. Converted vehicles can be used to meet your percentage requirements under both laws. However, only EPA-certified vehicles can be used to meet Clean-Fuel Fleet requirements.

What Fuels Can You Use?

The two laws allow different types of fuels to be used. Since the Energy Policy Act's purpose is to displace petroleum-based fuels, it only allows the use of alternative fuels. These are

- Methanol, denatured ethanol, and other alcohols;
- Mixtures containing 85% or more by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels;
- Natural gas;
- Liquefied petroleum gas (propane);
- Hydrogen;
- Coal-derived liquid fuels;
- Fuels (other than alcohol) derived from biological material; and
- Electricity.

This document provides in-depth information on the following alternative fuels: biodiesel fuel, electricity, ethanol, methanol, natural gas, and propane.

Because the Clean Air Act's purpose is to improve air quality, any fuel/vehicle combination capable of meeting EPA's Clean-Fuel Fleet standards is acceptable. This includes all the alternative fuels as well as conventional and reformulated gasoline, and diesel and clean diesel fuels.

Vehicle Certification and Warranties

Among vehicle offerings, manufacturers produce some vehicles that meet

EPA Clean-Fuel Fleet standards. Converters may convert vehicles or engines previously certified by EPA for operation on gasoline or diesel fuel to operate on alternative fuels. The level of emissions from the converted vehicle must be the same as or less than that before the conversion.

If you plan to purchase a converted alternative-fuel vehicle, ask to see certified emission results from before and after the conversion to ensure that your new vehicle meets EPA standards. Any vehicle or engine that has been certified as meeting the EPA's Clean-Fuel Fleet standards should have an underhood label that identifies it as such.

Alternative-fuel vehicles or engines produced by an OEM will carry OEM warranties. Converted vehicles will carry warranties that are covered either by the OEM or by a combination of the OEM and the converter. Contact your dealer for information on qualified converters and warranties.

Any alternative-fuel vehicle (OEM or conversion) can be used to meet EPACT requirements. Any alternative-fuel vehicle (OEM or conversion) that is also certified by EPA as meeting the Clean-Fuel Fleet standards can be used to meet EPACT and CAA requirements. However, only vehicles (alternative- or conventional-fuel) that have been certified by EPA to the Clean-Fuel Fleet standards can be used to meet CAA requirements.

Meeting Your Business Objectives and Other Benefits of Using Alternative-Fuel Vehicles

In the absence of legal or regulatory requirements, some fleet owners have voluntarily purchased alternative-fuel vehicles, choosing an alternative fuel that is better suited than conventional gasoline or diesel fuel to their location or business objectives.

Other fleet owners are taking advantage of the public relations opportunity, promoting their company's use of clean alternative fuels. Regardless of their reasons, these fleet owners are gaining valuable experience in the use of alternative fuels and alternative-fuel vehicles.

In some areas of the country, legislation requires transportation control measures, such as time-restricted vehicle operation, high-occupancy freeway lanes, and parking restrictions. If you buy and use alternative-fuel vehicles that the EPA has certified to ILEV standards, you may enjoy special exemptions from these control measures. The availability of these exemptions is, however, controlled by the Department of Transportation in individual states. Alternative-fuel vehicles may also receive special credits that exempt you from parts of some states' employee trip reduction programs.

If DOE finds that goals for displacing petroleum-based fuels with alternative fuels are not being met through mandatory purchases by federal and state fleets and fuel providers, it can then require private and municipal fleets to acquire alternative-fuel vehicles. Your decision to buy alternative-fuel vehicles now will help achieve the petroleum-displacement goals.

Special Purchase Incentives

EPACT Tax Incentives

TABLE 2

Tax Incentives	Per AFV Purchased					Per Fueling Site
	By Gross Vehicle Weight Rated of AFV			Special AFVs		
	Up to 10,000 lb	10,0001 to 26,000 lb	Over 26,000 lb	Buses Seating 20 or More	Electric Vehicles	
Credit[d]					10% Up to $4,000 per AFV	
Deduction	Up to $2,000 per AFV	Up to $5,000 per AFV	Up to $50,000 per AFV	Up to $50,000 per Bus		Up to $100,000 per Site

[d] Direct subtraction from tax liability.

To encourage and assist you in purchasing alternative-fuel vehicles, the EPACT provides tax deductions and credits to defray start-up costs (see Table 2). These are available to all fleets, even those not required by law or regulation to buy alternative-fuel vehicles. Other state and local financial incentive programs may be available in your area. For up-to-date information on these programs, funding, financing, and incentives, contact DOE's National Alternative Fuels Hotline (800/423-1DOE).

If your fleet operates in a CAA-designated area that requires a Clean-Fuel Fleet Program, you may be able to earn purchase credits for early or extra purchase of clean-fuel vehicles or for purchasing vehicles certified to stricter emission standards than required (see Table 3). You can "bank" or trade your purchase credits against fleet vehicle purchase requirements within that CAA-designated CMSA. The purchase credits apply to cars you buy or lease.

Fleets not covered by a Clean-Fuel Fleet Program but covered by EPACT may also be able to earn purchase credits if fleet managers buy or lease additional alternative-fuel vehicles. Depending upon individual state regulations, however, only vehicles certified by the EPA to Clean-Fuel Fleet emission standards may be used for credits. The purchase credits may be transferred or sold to another fleet, banked, or used to offset emissions from new sources within the same geographic area. Contact Jim Lindner, the U.S. Environmental Protection Agency (313/668-4558), for further information.

TABLE 3

Clean Air Act Purchase Credits Available for Alternative-Fuel Vehicles

	Standards	Available Fuels
Credits Start Here → / Tighter Standards ↓	Low-Emission Vehicle, Clean-Fuel Vehicle[e]	CNG, LPG, RFG, Clean Diesel[f]
	Inherently Low-Emission Vehicle	CNG
	Ultra-Low-Emission Vehicle	CNG
	Zero-Emission Vehicle	EV

[e] Credits can be earned by purchasing additional LEVs.
[f] RFG and clean diesel satisfy only CAA requirements.

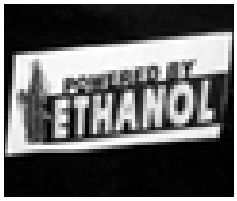
Which Alternative-Fuel Vehicles Are Best for Your Business?

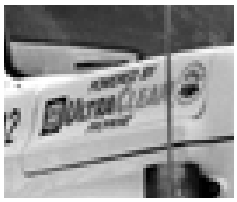
Whatever motivates your purchase of alternative-fuel vehicles, you should carefully examine the important operating characteristics specific to your fleet and then compare those features against the performance of alternative fuels to determine which types of alternative-fuel vehicles are right for your business.

Information on the characteristics of six alternative fuels—biodiesel fuel, electricity, ethanol, methanol, compressed natural gas, and propane—is provided in the next section to assist you with your comparison. To help you choose among alternative fuels, we have also included some key questions to consider.

How Will You Use Your Fleet Vehicles?

- What types of vehicles are in your fleet?
- How are your vehicles used? Long or short trips? How many miles per day or week? City or highway driving?
- Do your vehicles return to a central facility at the end of each work day? Could your vehicles be refueled overnight?
- Do your vehicles need substantial room to haul cargo or passengers?
- What is the average service life of your vehicle?
- What does it cost to replace a vehicle?
- How much do you pay for fuel for your vehicles?
- What are your vehicle maintenance costs?





Which Alternative Fuels Match Your Fleet's Needs?

- Do the OEMs offer the types of vehicles you require as an AFV?
- Are you willing to convert an OEM vehicle to use an alternative fuel if OEM AFVs are not available in the models you require?
- Are warranties available on the AFVs (OEMs and conversions)?
- Are alternative fuels available at public fueling stations in your fleet's service territory? Where are they located?
- Will you consider adding alternative-fuel fueling capabilities to your central facility if local fueling stations are not available?
- How much storage space is available in the AFVs you may be considering?
- What is the driving range of the AFV you may be considering?
- How does the cost of an AFV compare with the cost of the conventionally fueled vehicle you may be replacing?
- How does the cost of the alternative fuel compare to the cost of conventional gasoline or diesel fuel?
- Is direct funding available to help defray the cost of incorporating AFVs into your fleet? Are tax incentives available?

For up-to-date information on alternative fuels and alternative-fuel vehicles, contact DOE's National Alternative Fuels Hotline (800/423-1DOE).

Identifying the Right Fuels for Your Fleet

Below, we describe the key features of six alternative fuels (in alphabetical order). Although our descriptions are limited to those fuel and vehicle combinations that are readily available, the future also looks bright for many others that are now under development.

Alternative-fuel vehicle technology has lagged behind gasoline technology only because more money traditionally has been invested in gasoline research and development. Now, however, gains are being made in alternative-fuel technologies. Extensive research is being performed on every alternative fuel and on alternative-fuel technologies.

The right fuels today may change next year or in five years. When making short-term choices for fuel and vehicle technologies, remember the long-term benefits that may become available. Look for accounts of these benefits in future DOE publications.

Each of the following descriptions compares an alternative fuel to conventional gasoline or diesel fuel. For information on vehicles that are available for use with a particular fuel, please contact the sources listed.

Biodiesel Fuel

Fuel Description:
Liquid produced from such renewable sources as vegetable oils, animal fats, and used oil and fats. Biodiesel in its pure form (called neat biodiesel) has been designated as an alternative fuel for Energy Policy Act programs.

Domestic Content of Fuel
- 100%

Fueling
- Fueling is the same as with diesel fuel.

Fuel Availability
- Available only through bulk suppliers.
- Contact National Biodiesel Board for list of registered suppliers.

Vehicle Experience
- In the United States, over 30 million miles have been driven on neat biodiesel and biodiesel blends.

Operational Performance
- Horsepower, torque, and fuel economy are similar to those for diesel fuel.
- Cetane number is significantly higher than that of conventional diesel fuel.

Maintenance and Reliability
- Lubricity is improved over that of conventional diesel fuel.
- Costs are similar to those for conventional diesel fuel.
- Biodiesel-compatible elastomers (hoses, gaskets, etc.) are required for use with neat biodiesel and high-percentage biodiesel blends.

Safety
- Adequate training is required to operate and maintain vehicles.
- Flashpoint is significantly higher than that of conventional diesel fuel.
- Neat biodiesel is nontoxic and biodegradable.

Costs
- Use of biodiesel requires little or no engine modification.
- Neat biodiesel costs approximately $3.00 per gallon. However, costs are largely dependent on choice of feedstock.

For More Information, Contact:
- National Biodiesel Board
  573/635-3893 or 800/841-5849
- National Alternative Fuels Hotline
  800/423-1DOE

Electricity

Fuel Description:
Onboard rechargeable batteries power an electric motor.

Domestic Content of Fuel

- Over 95%, based on current mix of input energy (coal, natural gas, nuclear, hydropower, renewables) for electric-power generation.

Fueling

- A cord and plug (conductive) or cord and paddle (inductive) system connects to a 120-volt, 240-volt, or higher-voltage electrical source. The connecting device may be located aboard the vehicle or in a fixed, off-vehicle location.
- Time needed for charging depends on voltage of the electrical source; temperature; and size, type, and remaining state-of-charge of the batteries.

Fuel Availability

- Most homes, government facilities, fleet garages, and businesses have adequate electrical capacity for charging. Special hookups or upgrades may be required.
- Public charging facilities are being developed in many areas, especially in Southern California and Arizona.

Vehicle Experience

- Over 2,000 electric vehicles are operating throughout the United States (with the largest number in California and Arizona). Most are conversions of gasoline-powered vehicles.
- Many conversions and manufacturer-built prototypes have been used in utility fleets for testing and demonstrations.

Operational Performance

- Range for auto manufacturers' electric vehicles spans from 60 to 125 miles. Variables include the vehicle's weight, engineering and design features, and type of battery.
- Weather extremes and use of accessories (such as heating and air conditioning) can affect the range.
- Electric drivetrains are more energy-efficient than internal-combustion engines.
- Acceleration, speed, and handling for well-designed vehicles are equivalent to, or better than, those of comparable internal-combustion-powered vehicles.

Maintenance and Reliability

- Lead-acid battery packs are replaced, on average, about every 30,000 miles or three years. Service requirements are expected to be somewhat less. No tune-ups, oil changes, timing belts, water pumps, radiators, fuel injectors, or tailpipes are required.

Safety

- Auto suppliers will assist fleets with technical training. Some community colleges offer training for EV mechanics.
- EV-specific standards, specifications, and industry practices are being developed.

Costs

- Replacement packs for lead-acid batteries may cost $8,000 or more over the life of the vehicle. Their cost is likely to decrease as volume of production increases.
- Initial commercial production vehicles are expected to be priced in the $30,000s. Tax incentives could significantly lower costs. Leasing options will be available through manufacturers.
- Electricity costs less per mile than gasoline; local utility rates may vary.
- Installation of equipment at charging locations may involve additional expense.

For More Information, Contact:

- Electric Transportation Coalition
  202/508-5995
- The Electric Vehicle Association of the Americas
  415/249-2690 or 800/4EV-FACT
  e-mail: ev@evaa.org
  http://www.evaa.org
- Electric Power Research Institute
  415/855-2984
- Electric Auto Association
  800/537-2882
- Your local electric utility
- National Alternative Fuels Hotline
  800/423-1DOE

Ethanol

Fuel Description:
Liquid alcohol produced from grain or agricultural waste. E85 (a blend of 85% denatured ethanol and 15% gasoline) is for light-duty applications, while E95 (a blend of 95% denatured ethanol and 5% gasoline) is for heavy-duty applications.

Domestic Content of Fuel
- 100%

Fueling
- Fueling is the same as with gasoline or diesel fuel.

Fuel Availability
- Fueling stations are located primarily in the Midwest; more than 50 public E85 stations are available, in 12 states.
- E95 is available only through bulk suppliers.

Vehicle Experience
- More than 4,000 vehicles configured specifically for E85 are in use.

Operational Performance
- If compression ratio is optimized for higher octane rating, ethanol has approximately 80% or more of the energy density of gasoline.
- Requires more frequent fueling.
- Power, acceleration, payload, and cruise speed provided are comparable with those for equivalent conventional fuels.

Maintenance and Reliability
- Use special lubricants available by direct order from supplier (significant cost premium over standard motor oils).
- Use E85 replacement parts (that is, identify E85 as the fuel when ordering).
- Maintenance assistance is available from local dealers; practices are very similar, if not identical, to those for conventionally fueled operations.

Safety
- Adequate training is required to operate and maintain vehicles.

Costs
- E85 is sold in the Midwest at prices equivalent to those for midgrade unleaded gasoline.
- E85 flexible-fuel vehicles are provided in 1997 and 1998 by OEMs for $345 less to $1,000 more than comparable gasoline vehicles.

For More Information, Contact:
- National Ethanol Vehicle Coalition 573/635-8445 or 800/E85-8895
- Renewable Fuels Association 202/289-3835
- Clean Fuels Development Coalition 301/913-3633
- American Biofuels Association 703/522-3392
- National Alternative Fuels Hotline 800/423-1DOE

Methanol

Fuel Description:
Odorless clear liquid, produced from natural gas, coal, or biomass. M85 (a blend of 85% methanol and 15% gasoline) is for light-duty applications. M100 (pure methanol) is for heavy-duty applications.

Domestic Content of Fuel
- As high as 100%; about 90%, depending on world market price.

Fueling
- Fueling is the same as with conventional gasoline or diesel fuel.

Fuel Availability
- Fueling stations are widely available in California; they are also available in New York City, Atlanta, Denver, Houston, Detroit, and other locations.
- M100 is available through bulk suppliers in most major cities.

Vehicle Experience
- More than 15,000 M85 flexible-fuel vehicles are in operation.

Operational Performance
- Because of methanol's lower energy content, mileage will be slightly lower than for comparable gasoline-powered vehicles.
- Power, acceleration, and payload are comparable with those for equivalent internal-combustion engines.

Maintenance and Reliability
- Use special lubricants available by direct order from supplier (significant cost premium over conventional motor oils).
- Use M85-compatible replacement parts (that is, identify M85 as fuel when ordering).

Safety
- Adequate training is required to operate and maintain vehicles.

Costs
- M85 fuel cost is equal to, or slightly above, that for premium-blend gasolines. In California, the major methanol supplier adjusts the price of methanol to the average cost for regular unleaded gasoline (after accounting for the difference in energy content).
- M85 flexible-fuel vehicles are being offered at prices equivalent to or $345 less than those of comparable gasoline-powered vehicles.

For More Information, Contact:
- American Methanol Institute
  202/467-5050
  http://www.methanol.org
- California Energy Commission
  916/653-4634
- National Alternative Fuels Hotline
  800/423-1DOE

Natural Gas

Fuel Description:
Extracted from underground reserves, composed primarily of methane. For compressed natural gas (CNG), gas is compressed to 2,400–3,600 pounds per square inch in specially designed and constructed cylinders. For liquefied vehicle fuel (LNG), gas is cooled to minus 259°F and stored in insulated tanks.

Domestic Content of Fuel
- 100%

Fueling
- "Slow" fill (up to 8 hours) and "quick" fill (3 to 5 minutes) are available for CNG. LNG is dispensed like propane; fueling times are comparable with those for gasoline or diesel fuels.

Fuel Availability
- CNG fueling stations are located in most major cities and in many rural areas.
- LNG is only available through suppliers of cryogenic liquids.

Vehicle Experience
- Over 35,000 in the United States and nearly one million worldwide.

Operational Performance
- For CNG and LNG vehicles, the range depends on fuel storage capacity, but generally it is less than that of comparable gasoline-fueled vehicles.
- Power, acceleration, and cruise speed are comparable with those of an equivalent internal-combustion engine.
- Cylinder location and number may displace some payload capacity.

Maintenance and Reliability
- High-pressure tanks require periodic inspection and certification.
- Some fleets report two to three years longer service life and extended time between required maintenance. However, manufacturers and converters recommend conventional maintenance intervals.

Safety
- Pressurized tanks have been designed to withstand severe impact, high external temperatures, and automotive environmental exposure; they are as safe as gasoline tanks. Design changes have resolved problems responsible for earlier in-service failures.
- Adequate training is required to operate and maintain vehicles; training and certification of service technicians is required.

Costs
- Fuel cost is approximately 75% that of gasoline, per gasoline gallon equivalent; local utility rates vary.
- Conversion costs about $2,000 to $3,000 per vehicle. The manufacturer's price premium can be $250 to $6,000.
- Fleets may need to purchase service and diagnostic equipment if access to commercial CNG/LNG vehicle maintenance facilities is not available.

For More Information, Contact:
- Natural Gas Vehicle Coalition 703/527-3022
- American Gas Association 703/841-8000
- Gas Research Institute 773/399-8100
- Your local gas utility
- National Alternative Fuels Hotline 800/423-1DOE

Propane

Fuel Description:
Liquefied petroleum gas, or LPG (commonly called propane), is a liquid mixture (at least 90% propane, 2.5% butane and higher hydrocarbons, and the balance ethane and propylene). It is a by-product of natural gas processing or petroleum refining.

Domestic Content of Fuel
- Between 95 and 98%.

Fueling
- Similar to filling a gas grill tank; time is comparable with that needed for gasoline or diesel fuel.
- Tank should be filled to no more than 80% capacity, to allow for liquid expansion as ambient temperature rises.

Fuel Availability
- Publicly accessible fueling stations exist in all states—over 5,000 are documented. A directory is available.

Vehicle Experience
- Over 350,000 on- and off-road propane-powered units in the United States, and about 3.5 million worldwide.

Operational Performance
- Range is almost equivalent to that of comparable gasoline-powered vehicle.
- Power, acceleration, payload, and cruise speed are comparable with those obtained using an equivalent internal-combustion engine.

Maintenance and Reliability
- Some fleets report two to three years longer service life and extended time intervals between required maintenance. However, manufacturers and converters recommend conventional maintenance intervals.
- Propane combusts in the gaseous phase, resulting in less corrosion and engine wear.

Safety
- Adequate training is required to operate and maintain vehicles.

Costs
- Bulk purchases provide about a one-fifth saving in fuel cost compared with gasoline.
- Cost for fueling station is similar to, or lower than, that for a comparably sized gasoline dispensing system.
- Service and diagnostic equipment would probably be required if access to commercial propane vehicle maintenance facilities is not available.
- Factory-installed truck conversion costs about $1,000 over the conventional vehicle base price; nonfactory conversions average about $2,500.

For More Information, Contact:
- National Propane Gas Association 708/515-0600
- Propane Vehicle Coalition 202/371-6262
- National Alternative Fuels Hotline 800/423-1DOE

Areas Covered by EPACT ◆ and CAA +

CAA as currently required by EPA. Contact Jim Lindner, U.S. Environmental Protection Agency (313/668-4558) for the most current information.

ALABAMA

Birmingham ◆
Blount
Jefferson
St. Clair
Shelby

Columbus, GA-AL ◆
Russell

Mobile ◆
Baldwin
Mobile

Montgomery ◆
Autauga
Elmore
Montgomery

ARIZONA

Las Vegas, NV-AZ ◆
Mohave

Phoenix ◆
Maricopa
Pinal

Tucson ◆
Pima

ARKANSAS

Little Rock-North Little Rock ◆
Faulkner
Lonoke
Pulaski
Saline

Memphis, TN-AR-MS ◆
Crittenden

CALIFORNIA

Bakersfield ◆
Kern

Fresno ◆
Fresno
Madera

Los Angeles-Anaheim-Riverside ◆
Los Angeles (west)
Orange
Riverside (west)
San Bernardino (west)

Modesto ◆
Stanislaus

Sacramento-Yolo ◆
El Dorado
Placer
Sacramento
Yolo

Salinas ◆
Monterey

San Diego ◆
San Diego

San Francisco-Oakland-San Jose ◆
Alameda
Contra Costa
Marin
Napa
San Francisco
San Mateo
Santa Clara
Santa Cruz

San Joaquin ◆
Stockton

Santa Barbara-Santa Maria-Lompoc ◆
Santa Barbara

Southeast Desert (modified) ◆
Los Angeles (east)
Riverside (east)
San Bernardino (east)

Ventura ◆
Ventura

COLORADO

Colorado Springs ◆
El Paso

Denver-Boulder-Greeley* ◆+
Adams ◆+
Arapahoe ◆+
Boulder ◆+
Denver ◆+
Douglas ◆+
Jefferson ◆+
Weld ◆

CONNECTICUT

Hartford ◆
Hartford
Litchfield
Middlesex
New London
Tolland
Windham

New Haven-Meriden ◆
New Haven

New London-Norwich, CT-RI ◆
New London

New York-Northern New Jersey-Long Island, NY-NJ-CT-PA ◆
Fairfield
Litchfield
New Haven

DELAWARE

Philadelphia-Wilmington, Atlantic City, PA-NJ-DE-MD ◆
New Castle

DISTRICT OF COLUMBIA*

Washington, DC ◆+

Washington-Baltimore, DC-MD-VA-WV ◆+

FLORIDA

Daytona Beach ◆
Flagler
Volusia

Jacksonville ◆
Clay
Duval
Nassau
St. Johns

Lakeland-Winter Haven ◆
Polk

Melbourne-Titusville-Palm Bay ◆
Brevard

Miami-Ft. Lauderdale ◆
Broward
Dade

Orlando ◆
Lake
Orange
Osceola
Seminole

Pensacola ◆
Escambia
Santa Rosa

Tampa-St. Petersburg-Clearwater ◆
Hernando
Hillsborough
Pasco
Pinellas

West Palm Beach-Boca Raton-Delray Beach ◆
Palm Beach

GEORGIA

Atlanta* ◆+
Barrow ◆
Bartow ◆
Carroll ◆
Cherokee ◆+
Clayton ◆+
Cobb ◆+
Coweta ◆+
DeKalb ◆+
Douglas ◆+
Fayette ◆+
Forsyth ◆+
Fulton ◆+
Gwinnett ◆+
Henry ◆+
Newton ◆
Paulding ◆+
Pickens ◆
Rockdale ◆+
Spalding ◆
Walton ◆

Augusta-Aiken, GA-SC ◆
Columbia
Richmond

Chattanooga, TN-GA ◆
Catoosa
Dade
Walker

Columbus, GA-AL ◆
Chattahoochee
Harris
Muscogee

Macon ◆
Bibb
Houston
Jones
Peach
Twiggs

HAWAII

Honolulu ◆
Honolulu

IDAHO

Boise City ◆
Ada
Canyon

ILLINOIS

Chicago-Gary-Kenosha, IL-IN-WI* ◆+
Cook ◆+
DeKalb ◆
DuPage ◆+
Grundy ◆+
Kane ◆+
Kankakee ◆
Kendall ◆+
Lake ◆+
McHenry ◆+
Will ◆+

Davenport-Rock Island-Moline, IA-IL ◆
Henry
Rock Island

Peoria-Pekin ◆
Peoria
Tazewell
Woodford

Rockford ◆
Boone
Ogle
Winnebago

St. Louis, MO-IL ◆
Clinton
Jersey
Madison
Monroe
St. Clair

INDIANA

Chicago-Gary-Kenosha, IL-IN-WI* ◆+
Lake
Porter

Cincinnati-Hamilton, OH-KY-IN ◆
Dearborn
Ohio

Ft. Wayne ◆
Adams
Allen
DeKalb
Huntington
Wells
Whitley

Evansville-Henderson, IN-KY ◆
Posey
Vanderburgh
Warrick

Louisville, KY-IN ◆
Clark
Floyd
Harrison
Scott

Indianapolis ◆
Boone
Hamilton
Hancock
Hendricks
Johnson
Madison
Marion
Morgan
Shelby

IOWA

Davenport-Rock Island-Moline, IA-IL ◆
Scott

Des Moines ◆
Dallas
Polk
Warren

Omaha, NE-IA ◆
Pottawattamie

KANSAS

Kansas City, MO-KS ◆
Johnson
Leavenworth
Miami
Wyandotte

Wichita ◆
Butler
Harvey
Sedgwick

KENTUCKY

Cincinnati-Hamilton, OH-KY-IN ◆
Boone
Campbell
Gallatin
Grant
Kenton
Pendleton

Evansville-Henderson, IN-KY ◆
Henderson

Huntington-Ashland, WV-KY-OH ◆
Boyd
Greenup

Lexington ◆
Bourbon
Clark
Fayette
Jessamine
Madison
Scott
Woodford

Louisville, KY-IN ◆
Bullitt
Jefferson
Oldham

LOUISIANA

Baton Rouge* (parishes) ◆+
Ascension +
East Baton Rouge ⬥+
Iberville +
Livingston ⬥+
Pointe Coupe +
West Baton Rouge ⬥+

New Orleans (parishes) ◆
Jefferson
Orleans
Plaquemines
St. Bernard
St. Charles
St. James
St. John the Baptist
St. Tammany

Shreveport-Bossier City (parishes) ◆
Bossier
Caddo
Webster

MARYLAND

Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD ◆
Cecil

Washington-Baltimore, DC-MD-VA-WV* ◆+
Anne Arundel ⬥
Baltimore City ⬥
Baltimore County ⬥
Calvert ⬥+
Carroll ⬥
Charles ⬥+
Frederick ⬥+
Hartford ⬥
Howard ⬥
Montgomery ⬥+
Prince George's ⬥+
Queen Anne's ⬥
Washington ⬥

MASSACHUSETTS

Boston-Lawrence-Worcester, MA-NH (subsumes Fall River and Worcester) ◆+
Barnstable
Bristol
Dukes
Essex
Middlesex
Nantucket
Norfolk
Plymouth
Suffolk
Worcester

Springfield ◆
Franklin
Hampden
Hampshire

MICHIGAN

Detroit-Ann Arbor-Flint ◆
Genesee
Lenawee
Lapeer
Livingston
Macomb
Monroe
Oakland
St. Clair
Wayne
Washtenaw

Grand Rapids-Muskegon-Holland ◆
Allegan
Kent
Muskegon
Ottawa

Kalamazoo-Battle Creek ◆
Calhoun
Kalamazoo
Van Buren

Lansing-East Lansing ◆
Clinton
Eaton
Ingham

Saginaw-Bay City-Midland ◆
Bay
Midland
Saginaw

MINNESOTA

Duluth, MN-WI ◆
St. Louis

Minneapolis-St. Paul, MN-WI ◆
Anoka
Carver
Chisago
Dakota
Hennepin
Isanti
Ramsey
Scott
Sherburne
Washington
Wright

MISSISSIPPI

Jackson ◆
Hinds
Madison
Rankin

Memphis, TN-AR-MS ◆
DeSoto

MISSOURI

Kansas City, MO-KS ◆
Cass
Clay
Clinton
Jackson
Lafayette
Platte
Ray

St. Louis, MO-IL ◆
Franklin
Jefferson
Lincoln
St. Charles
St. Louis City
St. Louis County
Warren

NEBRASKA

Omaha, NE-IA ◆
Cass
Douglas
Sarpy
Washington

NEVADA

Las Vegas, NV-AZ ◆
Clark
Nye

NEW HAMPSHIRE

Boston-Lawrence-Worcester, MA-NH ◆
Hillsborough (east)
Rockingham (south)

NEW JERSEY

New York-Northern New Jersey-Long Island, NY-NJ-CT-PA ◆
Atlantic
Bergen
Cape May
Essex
Hudson
Hunterdon
Mercer
Middlesex
Monmouth
Morris
Ocean
Passaic
Somerset
Sussex
Union
Warren

Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD ◆
Burlington
Camden
Cumberland
Gloucester
Salem

NEW MEXICO

Albuquerque ◆
Bernalillo
Sandoval
Valencia

NEW YORK

Albany-Schenectady-Troy ◆
Albany
Montgomery
Rensselaer
Saratoga
Schenectady
Schoharie

Binghamton ◆
Broome
Tioga

Buffalo-Niagara Falls ◆
Erie
Niagara

New York-Northern New Jersey-Long Island, NY-NJ-CT-PA ◆
Bronx
Dutchess
Kings
Nassau
New York
Orange
Putnam
Queens
Richmond
Rockland
Suffolk
Westchester

Rochester ◆
Genesee
Linvingston
Monroe
Ontario
Orleans
Wayne

Syracuse ◆
Cayuga
Madison
Onondaga
Oswego

Utica-Rome ◆
Herkimer
Oneida

NORTH CAROLINA

Charlotte-Gastonia-Rock Hill, NC-SC ◆
Cabarrus
Gaston
Lincoln
Mecklenburg
Rowan
Union

Greensboro-Winston Salem-High Point ◆
Alamance
Davidson
Davie
Forsyth
Guilford
Randolph
Stokes
Yadkin

Hickory-Morgantown ◆
Alexander
Burke
Caldwell
Catawba

Norfolk-Virginia Beach-Newport News, VA-NC ◆
Currituck

Raleigh-Durham ◆
Chatham
Durham
Franklin
Johnston
Orange
Wake

OHIO

Canton-Massillon ◆
Carroll
Stark

Cincinnati-Hamilton, OH-KY-IN ◆
Brown
Clermont
Hamilton
Warren

Cleveland-Akron ◆
Ashtabula
Cuyahoga
Geauga
Lake
Lorain
Medina
Portage
Summit

Columbus ◆
Delaware
Fairfield
Franklin
Licking
Madison
Pickaway

Dayton-Springfield ◆
Clark
Greene
Miami
Montgomery

Huntington-Ashland, WV-KY-OH ◆
Lawrence

Toledo ◆
Fulton
Lucas
Wood

Youngstown-Warren ◆
Columbiana
Mahoning
Trumbull

OKLAHOMA

Oklahoma City ◆
Canadian
Cleveland
Logan
McClain
Oklahoma
Pottawatomie

Tulsa ◆
Creek
Osage
Rogers
Tulsa
Wagoner

OREGON

Eugene-Springfield ◆
Lane

Portland-Salem, OR-WA ◆
Clackamas
Columbia
Marion
Multnomah
Polk
Washington
Yamhill

PENNSYLVANIA

Allentown-Bethlehem-Easton ◆
Carbon
Lehigh
Northhampton

Harrisburg-Lebanon-Carlisle ◆
Cumberland
Dauphin
Lebanon
Perry

Erie ◆
Erie

Johnstown ◆
Cambria
Somerset

Lancaster ◆
Lancaster

New York-Northern New Jersey-Long Island, NY-NJ-CT-PA ◆
Pike

Philadelphia-Wilmington-Atlantic City PA-NJ-DE-MD ◆
Bucks
Chester
Delaware
Montgomery
Philadelphia

Pittsburgh ◆
Allegheny
Beaver
Butler
Fayette
Washington
Westmoreland

Reading ◆
Berks

Scranton-Wilkes Barre ◆
Columbia
Lackawanna
Luzerne
Wyoming

York ◆
York

PUERTO RICO

San Juan ◆

RHODE ISLAND

Entire State ◆

SOUTH CAROLINA

Augusta-Aiken, GA-SC ◆
Aiken
Edgefield

Charleston-North Charleston ◆
Berkeley
Charleston
Dorchester

Charlotte-Gastonia-Rock Hill, NC-SC ◆
York

Columbia ◆
Lexington
Richland

Greenville-Spartanburg-Anderson ◆
Anderson
Cherokee
Greenville
Pickens
Spartanburg

TENNESSEE

Chattanooga, TN-GA ◆
Hamilton

Johnson City-Kingsport-Bristol, TN-VA ◆
Carter
Hawkins
Sullivan
Unicoi
Washington

Knoxville ◆
Anderson
Blount
Knox
Loudon
Sevier
Union

Memphis, TN-AR-MS ◆
Fayette
Shelby
Tipton

Nashville ◆
Cheatham
Davidson
Dickson
Robertson
Rutherford
Sumner
Williamson
Wilson

TEXAS

Austin-San Marcos ◆
Bastrop
Caldwell
Hays
Travis
Williamson

Beaumont-Port Arthur ◆
Hardin
Jefferson
Orange

Corpus Christi ◆
Nueces
San Patricio

Dallas-Fort Worth ◆
Collin
Dallas
Denton
Ellis
Henderson
Hood
Hunt
Johnson
Kaufman
Parker
Rockwall
Tarrant

El Paso ◆
El Paso

Houston-Galveston-Brazoria ◆
Brazoria
Chambers
Fort Bend
Galveston
Harris
Liberty
Montgomery
Waller

McAllen-Edinburg-Mission ◆
Hidalgo

San Antonio ◆
Bexar
Comal
Guadalupe
Wilson

UTAH

Salt Lake City-Ogden ◆
Davis
Salt Lake
Weber

VIRGINIA

Johnson City-Kingsport-Bristol, TN-VA ◆
Bristol City
Scott
Washington

Norfolk-Virginia Beach-Newport News ◆
Chesapeake City
Gloucester
Hampton City
Isle of Wight
James City
Mathews
Newport News City
Norfolk City
Poquoson City
Portsmouth City
Suffolk City
Virginia Beach City
Williamsburg City
York

Richmond-Petersburg ◆
Charles City
Chesterfield
Colonial Heights City
Dinwiddie
Goochland
Hanover
Henrico
Hopewell City
New Kent
Petersburg City
Powhatan
Prince George
Richmond City

Washington-Baltimore, DC-MD-VA-WV* ◆+
Alexandria City ◆+
Arlington ◆+
Clarke +
Culpeper +
Fairfax ◆+
Fairfax City ◆+
Falls Church City ◆+
Fauquier ◆
Fredericksburg City ◆
King George ◆
Loudon ◆+
Manassas City ◆+
Manassas Park City ◆+
Prince William ◆+
Spotsylvania ◆
Stafford ◆+
Warren ◆

WASHINGTON

Portland-Salem, OR-WA ◆
Clark

Seattle-Tacoma-Bremerton ◆
Island
King
Kitsap
Pierce
Snohomish
Thurston

Spokane ◆
Spokane

WEST VIRGINIA

Charleston ◆
Kanawha
Putnam

Huntington-Ashland, WV-KY-OH ◆
Cabell
Wayne

Washington-Baltimore, DC-MD-VA-WV ◆
Berkeley
Jefferson

WISCONSIN

Appleton-Oshkosh-Neenah ◆
Calumet
Outagamie
Winnebago

Chicago-Gary-Kenosha, IL-IN-WI* ◆+
Kenosha

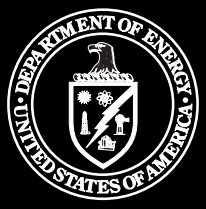
Duluth, MN-WI ◆
Douglas

Madison ◆
Dane

Milwaukee-Racine* ◆+
Milwaukee
Ozaukee
Racine
Washington
Waukesha

Minneapolis-St. Paul, MN-WI ◆
Pierce
St. Croix

*For certain CMSAs covered by both laws, EPA and DOE may include different counties in an area defined as a CMSA. The EPA includes counties in a CMSA that have been defined by the 1980 U.S. Census, while the DOE includes counties that have been defined by the 1990 U.S. Census.



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